CLAIMS:

1. Ionic compound consisting of an amide or salts thereof, comprising an anionic part associated with at least one cationic part M^{+m} in sufficient number to ensure an electronic neutrality thereto, characterized in that M is a hydroxonium, a nitrosonium NO^+, an ammonium $-NH_4^+$, a metallic cation having a valency m, an organic cation having a valency m or an organo-metallic cation having a valency m and in that the anionic part corresponds to the formula $R_F-SO_X-N^--Z$ in which:

- the group $-S(O)_X-$ represents a sulfonic group $-SO_2-$ or a sulfinyl group -SO-;
- R_F is a halogen or a perhalogenated alkyl, alkylaryl, oxa-alkyl, aza-alkyl or thia-alkyl radical, or a radical corresponding to one of the formulae R_ACF_2-, $R_ACF_2CF_2-$, $R_ACF_2CF(CF_3)-$ or $CF3C(R_A)F-$ in which R_A- represents a non-perhalogenated organic radical;
- Z represents an electro-attractor radical having a Hammett parameter at least equal to that of a phenyl radical, selected from:

j) -CN, $-NO_2$, -SCN, $-N_3$, $-CF_3$, R'_FCH_2- (R'_F being a perfluorinated radical), fluoroalkyloxy, fluoroalkylthioxy radical,

jj) radicals comprising one or more aromatic nuclei possibly containing at least one hydrogen, oxygen, sulfur or phosphorus atom, said nuclei possibly being condensed nuclei and/or said nuclei possibly carrying at least one substituent selected from halogens, -CN, $-NO_2$, -SCN, $-N_3$, $-CF_3$, CF_3CH_2-, $CF_2=CF-O-$, $CF_2=CF-S-$, perfluoroalkyl groups, fluoroalkyloxy groups, fluoroalkylthioxy groups, alkyl, alkenyl, oxa-alkyl, oxa-alkenyl, aza-alkyl, aza-alkenyl, thia-alkyl, thia-alkenyl radicals, polymer radicals, radicals having at least one cationic ionophoric group and/or at least one anionic ionophoric group;

with the proviso that a substituent Z may be a monovalent radical, part of a multivalent radical carrying a plurality of groups $R_F-S(O)_X-N-$, or a polymer segment;

or

- Z is a radical R_D-Y- in which Y is a sulfonyl, sulfinyl or phosphonyl group and R_D is a radical selected from the group consisting of:

a) alkyl or alkenyl radicals, aryl, arylalkyl, alkylaryl or alkenylaryl radicals, alicyclic or heterocyclic radicals, including polycyclic radicals;

b) alkyl or alkenyl radicals comprising at least one functional ether, thioether, amine, imine, carboxyl, carbonyl, hydroxy, silyl, isocyanate or thioisocyanate group;

c) aryl, arylalkyl, arylalkenyl, alkylaryl or alkenylaryl radicals, in which the aromatic nuclei and/or at least one substituent of the nucleus comprises heteroatoms such as nitrogen, oxygen, sulfur;

d) radicals comprising condensed aromatic cycles which possibly comprise at least one heteroatom selected from nitrogen, oxygen, sulfur;

e) halogenated alkyl, alkenyl, aryl, arylalkyl, alkylaryl or alkenylaryl radicals in which the number of carbon atoms carrying at least one halogen is at least equal to the number of non-halogenated carbon atoms, the carbon in α position of group Y not being halogenated when Y is $-SO_2-$, said radicals possibly comprising functional ether, thioether, amine, imine, carboxyl, carbonyl, hydroxy, silyl, isocyanate or thioisocyanate groups;

f) radicals $R_CC(R')(R'')-O-$ in which R_C is an alkyl perfluorinated radical and R' and R" are independently from one another, an hydrogen atom or a radical as defined in a), b), c) or d) above;

g) radicals $(R_B)_2N-$, in which the R_B, identical or different, are such as defined in a), b), c), d) and e) above, one of the R_B may be a hydrogen atom, or the two radicals R_B together form a bivalent radical which forms a cycle with N;

h) radicals consisting of a polymer chain;

i) radicals having one or more cationic ionophoric groups and/or one or more anionic ionophoric groups;

with the proviso that a substituent R_D may be a monovalent radical, part of a multivalent radical carrying a plurality of groups $R_FS(O)_x-N-Y-$, or a segment of a polymer;

with the proviso that, when Y is a sulfonyl or a carbonyl, and R_D is a radical such as defined in a), R_F is R_ACF_2-, $R_ACF_2CF_2-$, $R_ACF_2CF(CF_3)-$, $CF_3C(R_A)F-$ or a perhaloalkyl radical having 1 to 2 carbon atoms.

2. Compound according to claim 1, characterized in that the organic cation is an onium selected from the group consisting of R_3O^+ (oxonium), NR_4^+ (ammonium), $RC(NHR_2)_2^+$ (amidinium), $C(NHR_2)_3^+$ (guanidinium), $C_5R_6N^+$ (pyridinium), $C_3R_5N_2^+$ (imidazolium), $C_2R_4N_3^+$ (triazolium), $C_3R_7N_2^+$

(imidazolinium), SR_3^+ (sulfonium), PR_4^+ (phosphonium), IR_2^+ (iodonium), $(C_6R_5)_3C^+$ (carbonium), the radicals R independently representing H or a radical selected from the group consisting of:

- alkyl, alkenyl, oxa-alkyl, oxa-alkenyl, aza-alkyl, aza-alkenyl, thia-alkyl, thia-alkenyl, sila-alkyl, sila-alkenyl, aryl, arylalkyl, alkylaryl, alkenylaryl radicals, dialkylamino radicals and dialkylazo radicals;
- cyclic or heterocyclic radicals possibly comprising at least one lateral chain comprising heteroatoms such as nitrogen, oxygen, sulfur;
- cyclic or heterocyclic radicals possibly comprising heteroatoms in the aromatic nuclei;
- groups comprising a plurality of aromatic or heterocyclic, condensed or non-condensed nuclei, possibly containing at least one nitrogen, oxygen, sulfur or phosphorus atom;

with the proviso that a plurality of radicals R may together form aliphatic or aromatic cycles possibly enclosing the center carrying the cationic charge.

3. Compound according to claim 2, characterized in that cation onium is part of the radical Z or of the radical R_D.

4. Compound according to claim 2, characterized in that the onium cation is part of a recurring unit of a polymer.

5. Compound according to claim 2, characterized in that M^+ is a cationic heterocycle with aromatic character, including at least one alkylated nitrogen atom in the cycle.

6. Compound according to claim 5, characterized in that the cation is an imidazolium, a triazolium, a pyridinium, a 4-dimethyl-amino-pyridinium, said cations possibly carrying a substitutent on the carbon atoms of the cycle.

7. Compound according to claim 2, characterized in that the cation M is a group having a bond -N=N-, $-N=N^+$, a sulfonium group, an iodonium group, or a substituted or non-substituted arene-ferrocenium cation, possibly incorporated in a polymer network.

8. Compound according to claim 2, characterized in that the cation is a diaryliodonium cation, a dialkylaryliodonium cation, a triarylsulfonium cation, a

trialkylaryl sulfonium cation, or a substituted or non-substituted phenacyl-dialkyl sulfonium cation.

9. Compound according to claim 8, characterized in that the cation is part of a polymer chain.

10. Compound according to claim 2, characterized in that M is an organic cation, incorporating a group 2,2'[azobis(2-2'-imidazolinio-2-yl)propane]$^{2+}$ or 2,2'-azobis(2-amidiniopropane)$^{2+}$.

11. Compound according to claim 1, characterized in that the cation M is a metallic cation selected from the group consisting of cations of alkali metal, cations of alkali-earth metals, cations of transition metals, cations of trivalent metals, cations of rare earth metal and organometallic cations.

12. Compound according to claim 1, characterized in that the cation is a metallocenium, selected from the group consisting of cations derived from ferrocene, titanocene, zirconocene, indenocenium cations, arene metallocenium cations, cations of transition metals complexed with ligands of phosphine type possibly having a chirality and organometallic cations having one or more alkyl or aryl groups covalently fixed to an atom or a group of atoms, said cations possibly being part of a polymer chain.

13. Compound according to claim 1, characterized in that R_F is a fluorine atom or a perhalogenated alkyl radical having 1 to 12 carbon atoms, or a perhalogenated alkylaryl radical having 6 to 9 carbon atoms.

14. Compound according to claim 1, characterized in that R_F is selected from the radicals R_ACF_2-, $R_ACF_2CF_2$-, $R_ACF_2CF(CF_3)$- or $CF3C(R_A)F$- in which R_A represents an alkyl group, an aryl group, an alkylaryl or arylalkyl group, or a group comprising at least one ethylenic unsaturation and/or a condensable group and/or a dissociable group, a mesomorphous group; a chromophorous group; a self-doped electronically conductive polymer; a hydrolyzable alkoxysilane; a polymeric chain bearing grafts including a carbonyl group, a sulfonyl group, a thionyl group or a phosphonyl group; a group comprising a free radical trap; a dissociating dipole; a redox couple; a ligand complexing agent; a zwitterion; an amino acid or a optically or biologically active polypeptide; a chiral group.

15. Compound according to claim 1, characterized in that Z is a R_D-SO_2- group.

16. Compound according to claim 1, characterized in that R_D is selected from alkyl, alkenyl, oxa-alkyl, oxa-alkenyl, aza-alkyl, aza-alkenyl, thia-alkyl or thia-alkenyl radicals having 1 to 24 carbon atoms, or from aryl, arylalkyl, alkylaryl or alkenylaryl radicals having 5 to 24 carbon atoms.

17. Compound according to claim 1, characterized in that R_D is selected from alkyl or alkenyl radicals having 1 to 12 carbon atoms and possibly comprising at least one heteroatom O, N or S in the main chain or in a lateral chain, and/or possibly carrying a hydroxy group, a carbonyl group, an amine group, a carboxyl group.

18. Compound according to claim 1, characterized in that R_D is part of a poly(oxyalkylene) radical or a polystyrene radical.

19. Compound according to claim 1, characterized in that R_D is a radical having an iodonium, a sulfonium, oxonium, ammonium, amidinium, triazolium, guanidinium, pyridinium, imidazolium, phosphonium or carbonium group, said ionic group totally or partially acting as the cation M^+.

20. Compound according to claim 1, characterized in that R_D has one or more anionic ionophoric groups consisting of a carboxylate function ($-CO_2^-$), a sulfonate function ($-SO_3^-$), a sulfonimide function ($-SO_2NSO_2-$) or a sulfonamide function ($-SO_2N-$).

21. Compound according to claim 1, characterized in that R_D includes at least one ethylenic unsaturation and/or a condensable group and/or a group which is dissociable by thermal means, by photochemical means, or by ionic dissociation.

22. Compound according to claim 1, characterized in that R_D represents a mesomorphous group or a chromophorous group or a self-doped electronically conductive polymer or a hydrolyzable alkoxysilane.

23. Compound according to claim 1, characterized in that Z represents a recurring unit of a polymer chain.

24. Compound according to claim 1, characterized in that R_D includes a group capable of trapping free radicals.

25. Compound according to claim 1, characterized in that R_D includes a dissociating dipole.

26. Compound according to claim 1, characterized in that R_D includes a redox couple.

27. Compound according to claim 1, characterized in that R_D includes a complexing ligand.

28. Compound according to claim 1, characterized in that R_D-Y- is optically active.

29. Compound according to claim 1, characterized in that R_D-Y- represents an amino acid, or an optically or biologically active polypeptide.

30. Compound according to claim 1, characterized in that R_D represents a radical having a valency v higher than 2, including at each of its free end a group R_F-$S(O)_x$-N-.

31. Compound according to claim 1, characterized in that the substituent Z is selected from the group consisting of $-OC_nF_{2n+1}$, $-OC_2F_4H$, $-SC_nF_{2n+1}$ and $-SC_2F_4H$, $-OCF=CF_2$, $-SCF=CF_2$ and $C_nF_{2n+1}CH_2$- n being a whole number from 1 to 8.

32. Compound according to claim 1, characterized in that Z comprises a heterocycle, derived from pyridine, pyrazine, pyrimidine, oxadiazole or thiadiazole, which is fluorinated or non-fluorinated.

33. Ionically conductive material comprising an ionic compound in solution in a solvent, characterized in that the ionic compound is a compound according to claim 1.

34. Ionically conductive material according to claim 33, characterized in that at least one of the substituents R_F or R_D of the ionic compound comprises an alkyl group, an aryl group, a alkylaryl group or an arylalkyl group; a mesomorphous group or a group comprising at least one ethylenic unsaturation and/or a condensable group and/or a group which is dissociable by thermal means, by photochemical means or by ionic dissociation; a self-doped electronically conductive polymer; a hydrolysable alkoxysilane; a free radical trap; a dissociating dipole; a redox couple, a complexing ligand.

35. Ionically conductive material according to claim 33, characterized in that the substituent R_D of the ionic compound is an alkyl or an alkenyl which contains at least one heteroatom selected from O, N and S; an alkyl or an alkenyl carrying a hydroxy group, a carbonyl group, an amine group, a carboxyl group; an aryl, an arylalkyl, an alkylaryl or an alkenylaryl in which the lateral chains and/or the aromatic nuclei comprise heteroatoms.

36. Material according to claim 33, characterized in that the substituent R_D is a recurring unit of a polymer.

37. Ionically conductive material according to claim 33, characterized in that the substituent Z of the ionic compound is selected from the group consisting of $-OC_nF_{2n+1}$, $-OC_2F_4H$, $-SC_nF_{2n+1}$ and $-SC_2F_4H$, $-OCF=CF_2$, $-SCF=CF_2$.

38. Ionically conductive material according to claim 33, characterized in that the solvent is either an aprotic liquid solvent, selected from linear ethers and cyclic ethers, esters, nitriles, nitro derivatives, amides, sulfones, sulfolanes, sulfamides and partially halogenated hydrocarbons, or a polar polymer, or a mixture thereof.

39. Ionically conductive material according to claim 38, characterized in that the solvent is a cross-linked or non-cross-linked solvating polymer, which may carry grafted ionic groups.

40. Ionically conductive material according to claim 39, characterized in that the solvating polymer is selected from polyethers of linear structure, comb or blocks, which may form a network, based on poly (ethylene oxide), copolymers

containing ethylene oxide, propylene oxide or allylglycidylether units, polyphosphazenes, cross-linked networks based on polyethylene glycol cross-linked with isocyanates, polymer networks obtained by polycondensation and carrying groups which enable the incorporation of cross-linkable groups and block copolymers in which some blocks carry functions which have redox properties.

41. Ionically conductive material according to claim 33, characterized in that the solvent essentially consists of a liquid aprotic solvent and a polar polymer solvent comprising units containing at least one heteroatom selected from sulfur, oxygen, nitrogen and fluorine.

42. Ionically conductive material according to claim 41, characterized in that the polar polymer mainly contains units derived from acrylonitrile, vinylidene fluoride, N-vinylpyrrolidone or methyl methacrylate.

43. Ionically conductive material according to claim 33, characterized in that it additionally contains at least one second salt.

44. Ionically conductive material according to claim 33, characterized in that it additionally contains a mineral or organic charge in the form of powder or fibres.

45. Electrochemical generator comprising a negative electrode and a positive electrode both separated by an electrolyte, characterized in that the electrolyte is a material according to one of claims 33 to 44.

46. Generator according to claim 45, characterized in that the negative electrode consists of metallic lithium, or an alloy thereof, optionally in the form of nanometric dispersion in lithium oxide, or a double nitride of lithium and a transition metal, or an oxide with low potential having the general formula $Li_{1+y+x/3}Ti_{2-x/3}O_4$ ($0 \leq x \leq 1$, $0 \leq y \leq 1$), or carbon and carbon products originating from pyrolysis of organic materials.

47. Generator according to claim 45, characterized in that the positive electrode is selected from vanadium oxides VO_x ($2 \leq x \leq 2.5$), LiV_3O_8, $Li_yNi_{1-x}Co_xO_2$, ($0 \leq x \leq 1$; $0 \leq y \leq 1$), spinels of manganese $Li_yMn_{1-x}M_xO_2$ (M = Cr, Al, V, Ni, $0 \leq x \leq 0,5$; $0 \leq y \leq 2$), organic polydisulfides FeS, FeS_2, iron

sulfate $Fe_2(SO_4)_3$, phosphates and phophosilicates of iron and lithium of olivine structure, or substituted products where iron is substituted by manganese, used alone or in admixtures.

48. Generator according to claim 45, characterized in that the collector of the cathode is made of aluminum.

49. Supercapacitance utilizing at least one carbon electrode with high specific surface, or an electrode containing a redox polymer, in which the electrolyte is a material according to one of claims 33 to 44.

50. Use of a material according to one of claims 33 to 44 for p or n doping of an electronically conductive polymer.

51. Electrochrome device in which the electrolyte is a material according to one of claims 33 to 44.

52. Process for polymerization or cross-linking of monomers of prepolymers capable of cationic reaction, characterized in that there is used a compound according to claim 1 as photoinitiator acting as a source of acid catalyzing the reaction.

53. Process according to claim 52, characterized in that the cation of the ionic compound is a group having a bond $-N=N^+$, -N=N-, a sulfonium group, an iodonium group, or a substituted or non-substituted arene-ferrocenium cation, such group optionally being incorporated in a polymeric network.

54. Process according to claim 52, characterized in that at least one of the substituents R_F or Z is a non-substituted alkyl radical or a radical comprising an oxa, sulfoxide, sulfone, phosphine oxide or phosphonate group.

55. Process according to claim 52, characterized in that the monomers are selected from the group consisting of compounds which include a cyclic ether function, a cyclic thioether function or a cyclic amino function, vinyl compounds, vinylether, oxazolines, lactones and lactames.

56. Process according to claim 52, characterized in that the polymer is selected from the group consisting of compounds in which epoxy groups are carried by an aliphatic chain, an aromatic chain or a heterocyclic chain.

57. Process according to claim 52, characterized in that it consists of mixing the photoinitiator with at least one monomer or prepolymer capable of cationic polymerization, and subjecting the mixture obtained to actinic radiation, including β radiation.

58. Process according to claim 57, characterized in that the reaction mixture is treated with radiation after having been shaped into a thin layer.

59. Process according to claim 52, characterized in that the photoinitiator is used in the form of a solution in a solvent which is inert towards the polymerization reaction.

60. Process according to claim 59, characterized in that the inert solvent is selected from the group consisting of acetone, methylethyl ketone, acetonitrile, propylene carbonate, γ-butyrolactone, ether-esters of mono-, di-, tri- ethylene or propylene glycols, ether-alcohols of mono-, di-, tri- ethylene or propylene glycols, esters of phthalic or citric acids.

61. Process according to claim 52, characterized in that the reaction is carried out in the presence of a solvent or a diluent consisting of a compound which is reactive towards polymerization.

62. Process according to claim 61, characterized in that the reactive compound is selected from the group consisting of mono- and di- vinylethers of mono-, di-, tri-, tetra- ethylene or propylene glycols, trivinyl ether trimethylolpropane and divinylether of dimethanolcyclohexane, N-vinylpyrolidone, 2-propenylether of propylene carbonate.

63. Process according to claim 52, characterized in that a photosensitizer is added to the reaction mixture.

64. Process according to claim 63, characterized in that the photosensitizer is selected from the group consisting of anthracene, diphenyl-9,10-anthracene,

perylene, phenothiazine, tetracene, xanthone, thioxanthone, isopropylthioxantone, acetophenone, benzophenone, 1,3,5-triaryl-2-pyrazolines and derivatives thereof, in particular derivatives which are substituted on aromatic nuclei by alkyl, oxa- or aza-alkyl radicals.

65. Process according to claim 52, characterized in that the reaction mixture additionally contains at least one monomer or prepolymer capable of free radical polymerization and a compound capable of releasing a free radical initiator under the effect of actinic radiation or β radiation or heat.

66. Process for modifying solubility properties of a polymer having groups sensitive towards acids, characterized in that it consists of subjecting said polymer to actinic radiation or β radiation, in the presence of a compound according to claim 1.

67. Process according to claim 65, characterized in that the polymer contains ester or arylether units derived from tertiary alcohol.

68. Process according to claim 67, characterized in that the polymer is selected from the group consisting of homopolymers and copolymers of tertiobutyl or tertioamyl acrylate, tertiobutyl or tertioamyl itaconate, (tertiobutoxycarbonyloxystyrene) or (tertioamyloxystyrene).

69. Process according to claim 66, characterized in that it is utilized for the chemical amplification of photoresists.

70. Process for the polymerization of vinyl monomers, characterized in that a compound according to claim 10 is used as free radical initiator.

71. Composition of cationic coloring material, characterized in that it contains a compound according to claim 1.

72. Composition of cationic coloring material according to claim 71, characterized in that the negative charge(s) of the ionic group $R_F\text{-}SO_X\text{-}N^-\text{-}Z$ are either fixed on the molecule of the coloring material, or they constitute the counter-ion of positive charges of the coloring material.

73. Use of a compound according to claim 1 as catalyst in Friedel and Craft reactions, Diels and Alder reactions, additions of Michael, reactions of allylation, reactions of pinacolic coupling, reactions of glycosilation, reactions of opening cycles of oxetanes, reactions of aldolization, reactions of metathesis of alkenes, polymerizations of Ziegler-Natta type, polymerizations of metathesis type by cycle opening and polymerizations of metathesis type of acyclic dienes.

74. Use according to claim 73, characterized in that the compound is a compound according to claim 1 in which the cation is selected from lithium, magnesium, copper, zinc, tin, trivalent metals, including rare earths, platinoids, and organometallic cations.

75. Use of a compound according to claim 6 as a solvent to carry out chemical, photochemical, electrochemical, photoelectrochemical reactions, said compound being used above its melting point.

76. Electronically conductive material characterized in that it comprises an ionic compound according to claim 1.

77. Electronically conductive material according to claim 76, characterized in that the cationic part of the ionic compound is a polycation consisting of a doped conjugated polymer "p".

78. Electronically conductive material according to claim 76, characterized in that the substituent Z of the ionic compound comprises an alkyl chain having 6 to 20 carbon atoms.